

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN AND RELATING TO PROJECTING MOVING IMAGES

(71) I, JAMES DOODY, a British subject of 40 Pentland Road, Worthing, Sussex, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to improvements in projecting moving images and has particular, but not exclusive application to projecting multi-coloured liquid moving images.

It is now well known to produce moving images by locating a translucent (including transparent) patterned disc in the light path of an optical projector and thereafter rotating said disc about an internal axis so that the light beam passes continuously through said disc to project moving images. Said disc can be of, for example, the so-called geometrical type, in which the pattern is of a fixed predetermined design, or, preferably, the so-called liquid-wheel type, in which mutually immiscible liquids are contained in a cavity defined between mutually parallel translucent plates so that the liquid interfaces change on rotation of the disc assembly (see especially U.K. Patent No. 1246566). The optical projector can include a stationary translucent disc of fixed pattern and located in the light path so that the moving image is superimposed on the image of the stationary disc. Alternatively or additionally, liquid wheel assemblies can include two or more of the said immiscible liquid-containing cavities to enhance the optical effect. These cavities are however maintained in fixed spatial relationship with each other and the assembly rotated as a single unit.

I have now found that an improved optical effect can be obtained by arranging two translucent discs sequentially in the light path of an optical projector and thereafter counter-rotating said discs about respective

internal axes.

According to the present invention therefore, there is provided an optical projector for projecting moving images, which projector comprises

a pair of translucent patterned discs, means for rotatably mounting said discs sequentially in the light path of the projector and

means for rotating said discs in opposite senses about respective internal axes.

The translucent patterned discs can be any of those known in the art and one or each disc can be a composite disc formed of two or more patterned members. In particular, said discs can be of the so-called geometrical type comprising, for example, a photographic slide. Preferably however, one at least of said discs is of the so-called liquid wheel type comprising one or more immiscible liquid containing cavities. The two discs can, of course, be of different types and one or each disc can be a composite of two or more types. The projector can include also one or more stationary translucent discs also disposed in the light path so that the moving images are superimposed on stationary images. Additional rotational discs can also be included. Advantageously, but not necessarily, some, and preferably all of the discs are multicoloured to produce multicoloured moving images.

It will be appreciated that the term "translucent" used herein means merely transmitting light of some at least of the wavelengths of the projector light beam and therefore includes "transparent" (i.e. transmission of light without diffusion). It will be appreciated also that the term "patterned" includes variable as well as fixed patterns.

The means for mounting the discs suitably comprises a holder rotatably carrying by, for example, ball-bearings, the discs and adapted to be slidably received in a cooperating locating guide secured to the

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body of the projector. Said holder preferably comprises a plate adapted to be received in said guide and having non-rotatably attached thereto the inner race of a ball-bearing. The outer race of said bearing is in turn non-rotatably attached to the inner race of a second bearing. The inner race of the second bearing carries one of the patterned discs for rotation therewith whilst the outer race of said bearing carries the other of the patterned discs.

The means for rotating the discs in opposite senses suitably comprise drive means such as an endless belt or a wheel engaging the outer circumferential surface of the respective disc or of means holding and rotatable with the disc. In the case where the discs are carried by or comprise races of ball-bearings as described in the preceding paragraph, said drive means will engage the outer circumferential surface of the outer races. It is preferred that, when the drive means is a wheel which frictionally engages the relevant circumferential surface, said surface should be knurled or otherwise roughened to improve frictional grip.

The respective drive means can be driven by separate motors to provide the desired counter-rotation. Alternatively, a single motor can drive both drive means via appropriate gearing to reverse the rotational sense of one of said means. The discs can be rotated at the same or different angular velocities. Usually said velocities will be constant but provision can be made to vary their velocity if desired.

The rotatable discs advantageously are axially aligned and are rotated about their central axis. However, the central axes of the discs can be otherwise arranged such as in spaced parallel relationship and/or the discs can be rotated about respective internal axes other than their central axis.

The following is a description by way of example only and with reference to the drawing of an optical projector in accordance with a preferred embodiment of the present invention. In the drawing, the single Figure is a diagrammatic longitudinal cross-sectional view of an optical projector.

Referring to the drawing, an optical projector, generally indicated at 1, comprises a light source 2, heat filter 3 and optical condenser 4 arranged on one side of an assembly 5. On the other side of assembly 5, there is a lens 6 and a screen 7. Said components are appropriately spaced apart along the light path indicated by broken line 8 so that moving images are projected on screen 7 by rotatable patterned discs 9, 10 and 11 in assembly 5.

The assembly 5 comprises a guide member 12 secured to the projector body (not shown) and including transversely spaced guide channels 13 to slidably receive

from above a plate 14. This plate and the guide member have respective orifices to be aligned with the light path 8. The plate 14 is extended forwardly about its orifice to constitute the inner race of a ball bearing 15. The outer race 16 of bearing 15 is extended forwardly in an axially inner annular flange adapted to be a friction fit in the inner race 17 of a second ball bearing 18. For the purposes of clarity, the balls between the races in bearings 15 and 17 respectively have been omitted.

Inner race 17 has secured therein the disc 9 constituted by a longitudinally spaced pair of plates which are sealed between their circumferences to define a cavity in which a plurality of differently coloured immiscible liquids are located. Outer race 19 of ball bearing 18 has secured therein the discs 10, 11 which are longitudinally spaced apart and both are of the same construction as disc 9. Said disc construction is described in U.K. Patent Specification No. 1246566.

The outer circumferential surfaces of races 16, 19 are each formed with a plurality of longitudinally extending slightly arcuate grooves which are circumferentially spaced apart to provide a knurled surface. A first rubber drive wheel 20 driven by an electric motor 21 frictionally engages the said surface of race 16 to rotate the race 16 about the inner race of bearing 15. Similarly a second rubber drive wheel 22 driven by a second electric motor 23 frictionally engages the outer surface of race 19 to rotate it about race 17. The motors 21, 23 drive wheels 20, 22 respectively so that the outer races 16, 19 rotate in opposite senses.

In operation, rotation of races 16, 19 by wheels 20, 22 cause disc 9 to rotate in the opposite sense to discs 10, 11. As said discs rotate, the interface between the immiscible liquids in the respective chambers of the discs cause moving images to be projected upon screen 7 providing a so-called psychedelic experience.

If desired, one or more geometrical discs in, for example, the form of circular colour photographic slides can be inserted into one or both of races 16, 19 for rotation therewith. It will be appreciated that some or all of the liquid-wheel type discs 9, 10 and 11 could be replaced by geometrical or other discs.

The invention is not restricted to the details described above and numerous modifications and variations of said details can be made without departing from the scope of the invention.

WHAT I CLAIM IS:-

1. An optical projector for projecting moving images, which projector comprises a pair of translucent patterned discs, means for rotatably mounting said discs sequentially in the light path of the projec-

tor, and

means for rotating said discs in opposite senses about respective internal axes.

5 2. A projector as claimed in Claim 1 wherein one or each disc is a composite disc formed of two or more patterned members.

3. A projector as claimed in Claim 1 or Claim 2 wherein at least one of said discs is of the geometrical type (as hereinbefore defined).

10 4. A projector as claimed in any one of the preceding Claims wherein at least one of said discs is of the liquid wheel type (as hereinbefore defined).

15 5. A projector as claimed in any one of the preceding Claims including also one or more stationary translucent discs disposed in the light path so that moving images generated by the said pair of rotatable discs are superimposed on stationary images.

20 6. A projector as claimed in any one of the preceding Claims wherein at least one of the discs of the projector are multicoloured.

25 7. A projector as claimed in any one of the preceding Claims wherein the means for rotatably mounting the discs comprises a holder rotatably carrying the discs and adapted to be slidably received in a cooperating locating guide secured to the body of the projector.

30 8. A projector as claimed in Claim 7 wherein said holder comprises a plate

adapted to be received in said guide and having non-rotatably attached thereto an inner race of a bearing, the outer race of which bearing is non-rotatably attached to an inner race of a second bearing and the inner race of the second bearing carries one of the patterned discs for rotation therewith whilst the outer race of the second bearing carries the other of the patterned discs.

9. A projector as claimed in any one of the preceding Claims wherein the means for rotating the discs in opposite senses comprises drive means engaging the outer circumferential surface of the respective disc or of means holding and rotatable with the disc.

10. A projector as claimed in any one of the preceding Claims wherein the discs are rotatable at different angular velocities.

11. A projector as claimed in any one of the preceding Claims wherein the rotatable discs are axially aligned and rotatable about their central axis.

12. A projector substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

For the Applicant,

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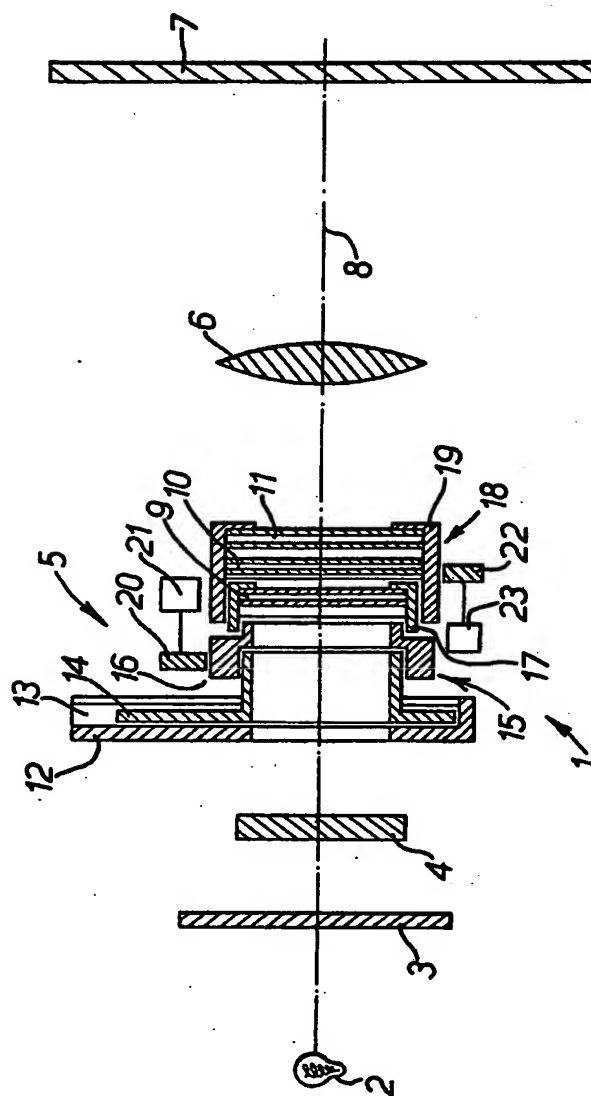
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COMPLETE SPECIFICATION
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